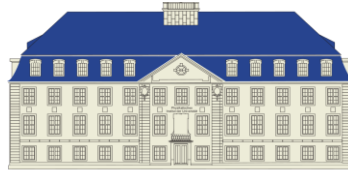




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## COLLOQUIUM „OPTICS AND CONDENSED MATTER“

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*Aarhus University, Denmark*

### **Answering Schrödinger's puzzle: Fluctuations of a quantum gas**

Quantum systems are characterized by the inherent fluctuation of their physical observables. Despite this fundamental importance, the investigation of the fluctuations in interacting quantum systems at finite temperature continues to pose considerable challenges. Many of these challenges are related to the statistical ensemble that is used in their theoretical description.

I will report on the characterization of atom number fluctuations in weakly interacting Bose-Einstein condensates. Strikingly, we observe fluctuations reduced by 27% below the canonical expectation for a non-interacting gas, revealing their microcanonical nature and validating the so-called Maxwell's demon ensemble. This shows that a microcanonical treatment is indeed required for quantitative predictions of the effect of interactions on the fluctuations in cold atomic gases. In addition, we briefly discuss the investigation of corresponding fluctuations in the terminal part of the system and outline the outstanding questions in the field.

**May 19th, starting with discussion at 17:00 h, talk at 17:15 h, live IAP lecture hall or via Zoom**

<https://uni-bonn.zoom.us/j/98441612025?pwd=a01SSjlkY1Q3SDFhL09JQk1qc1V6dz09>

Meeting-ID: 984 4161 2025

Kenncode: 294164